

REMARKS

Upon entry of this Amendment, claims 1-11 and 13-31 will be pending in the present application. Claims 1, 22, 30 and 31 are independent claims. Claims 1, 22, 30 and 31 have been amended. Reconsideration of this Application, as amended, is respectfully requested.

Examiner Interview

Applicant wishes to thank the Examiner for the courtesies extended to Applicant's representative during the interview, which was conducted on June 10, 2004. An Examiner Interview Summary was made of record as Paper No. 20040610. During the interview, Applicant's representative pointed out that the prior art of record, including Chen, fails to teach reducing an internal binding force in a metal layer. Further, Chen does not teach increasing an etch rate of the metal layer in a subsequent etch cycle, but actually states a goal of maintaining a removal rate of the metal layer in a subsequent etch cycle (see Chen, Col.1, lines 32-35).

The Examiner maintained that the process of Chen and the Applicant's claimed process should produce similar results. Particularly, the Examiner stated that an internal binding force in a metal layer may be reduced inherently due to the process of Chen. However, the Examiner admitted that Chen does not teach that more of the metal layer is removed in a given amount of time. Rather, Chen teaches that a lesser amount photoresist is removed in a given amount of time.

Proposed changes to the claims were discussed, including amendments to the claims specifying an increased etch rate. Accordingly, the claims have been amended in the manner discussed during the interview, and are believed to place the application into condition for allowance. Accordingly, reconsideration and allowance of the present application are respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 1, 2, 5-9, 11,13, 15, 16, 20-22, 24 and 28-31 stand rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,771,110 to Hirano et. al. (Hirano) in view of U.S. Patent No. 6,133,145 to Chen, and claims 10, 17-19 and 25-27 stand rejected over Hirano and Chen as applied to claims 1, 7, 22 and 30 in view of U.S. Patent No. 5,968,847 to Ye et al. (Ye), and claims 3, 4, 14 and 23 stand rejected over Hirano and Chen and further in view of Muraguchi. These rejections are respectfully traversed.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the present Application, Applicant respectfully submits that independent claim 1 has been amended to recite a combination of steps in a method of manufacturing a liquid crystal display device, including treating the exposed portion of said metal layer with a first plasma, prior to any step of etching said photoresist pattern, and prior to any step of etching said metal layer, to lower an internal binding force in the

exposed portion of said metal layer to increase a subsequent etch rate of said metal layer.

Independent claims 22 has been amended to recite a combination of steps in a method of patterning a metal layer, including exposing the uncovered portion of said metal layer to a first plasma, prior to any step of etching said metal layer, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer.

Independent claim 30 has been amended to recite a combination of steps in a method of manufacturing a pixel electrode in a liquid crystal display device, including exposing the uncovered portion of said metal layer to at least one first gas, prior to any step of etching said photoresist pattern and prior to any step of etching said metal layer, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer.

Independent claim 31 has been amended to recite a combination of steps in a method of manufacturing a pixel electrode in a liquid crystal display device, including exposing the uncovered portion of said metal layer to at least one first gas, prior to any step of etching, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer.

Applicant respectfully submits that these combinations of steps as recited in independent claims 1, 22, 30 and 31 (as amended) are not disclosed or fairly suggested by the prior art of record including Hirano and Chen.

Particularly, Chen compares two embodiments thereof in order to illustrate an increase in etch/ratio (not etch rate) when plasma pre-treatment is used prior to a final etch cycle in the second embodiment. Figs. 1-3 of Chen show an embodiment wherein an etch ratio between the metal layer and the photoresist is only about 2 to 1 (Chen, Col.3, lines 55-57). This first etch ratio is achieved without the plasma pre-treatment of the photoresist pattern prior to the final etch cycle.

Figs. 4-6 of Chen show an embodiment wherein an etch ratio between the metal layer and the photoresist is increased from about 2 to 1 to about 2.5 to 1. Chen wholly attributes the increased etch ratio to a lesser amount of photoresist being removed during a final etch cycle. In other words, Chen does not teach (or suggest) that an etch rate of the metal layer is increased at all. Chen actually teaches away from such a result (see Chen, Col.1, lines 32-35). Therefore Chen fails to teach or suggest the combinations of steps as recited above in amended claims 1, 22, 30 and 31.

Claims 2, 5-9, 11, 13, 15, 16, 20, 21, 24, 28 and 29 depend, either directly or indirectly, on claims 1, 22 and 30. Since neither Hirano, nor Chen, discloses or suggest the features of independent claims 1, 22, 30 and 31, Hirano, in view of Chen, cannot render claims 1, 2, 5-9, 11, 13, 15, 16, 20-22, 24 and 28-31 obvious to one of ordinary skill in the art.

Claims 3, 4, 10, 14, 17-19, 23 and 25-27, also depend on claims 1, 22, and 30. Since neither Hirano, nor Chen, nor Ye, nor Muraguchi discloses or

suggests the features of independent claims 1, 22, and 30, Hirano and Chen, in view of Ye, or Hirano and Chen in view of Muraguchi cannot render claims 3, 4, 10, 14, 17-19, 23 and 25-27 obvious to one of ordinary skill in the art.

Reconsideration and withdrawal of these art grounds of rejection is respectfully requested.

Conclusion

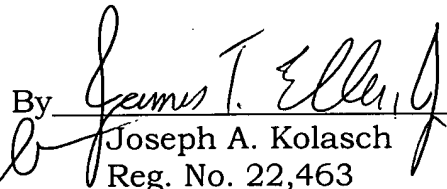
Applicant considers all of the Examiner's comments to have been addressed and all of the Examiner's rejections overcome, thereby placing all claims pending in the present Application in condition for allowance. Accordingly, a Notice of Allowability is solicited in earnest.

In the event that any outstanding matters remain in this application, Applicant requests that the Examiner contact Percy L. Square (Reg. No. 51,084) at (703) 205-8034 to discuss such matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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